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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,368	10/22/2003	Thomas Robert Raber	RD29386-1	1398

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER

VJAYAKUMAR, KALLAMBELLA M

ART UNIT	PAPER NUMBER
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1751

DATE MAILED: 04/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/691,368

Applicant(s)

RABER ET AL.

Examiner

Kallambella Vijayakumar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-9 is/are allowed.
- 6) ☒ Claim(s) 10-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

- Claims 1-30 are currently pending with the application.
- The examiner has considered the IDS filed 02/06/2004.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 10-12, 14, 16 and 25-26 are rejected under 35 U.S.C. 102(a) as being anticipated by Nakai et al (JP 2002-324445).

Nakai et al teach forming a long conductive composite of MgB₂ by passing a linear body of boron through a molten metal of Mg or its alloy (Abstract, Para 0020). The prior art teaches the passing boron fibers of about 100 micron diameter (filaments) through molten Mg alloy containing elements such as Cu and Ag (dopants) at a temperature of 800-1100°C (Para 0022-0026) and forming rolled coil (tape/article). With regard to claim 25, the prior art teaches a MgB₂ tape/coil, and the examiner assures that the art article will be identical to that produced by the instant claimed process. With regard to claim 26, the prior art teaches a coil/tape. With regard to product-by-process limitations in claims 25-26, the prior art teaches a tape/coil, and "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not

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depend on its method of production. If the product in the product-by-process claim is the same as a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). All the limitations of the instant claims are met.

The reference is anticipatory.

2. Claims 17-23 and 27 are rejected under 35 U.S.C. 102(a) as being anticipated by Miyoshi (JP 2003-086265).

Miyoshi teaches connecting terminals of MgB₂ superconducting wires and a method of forming such a connection by exposing the MgB₂ superconductors, contacting them mutually, twisting with boron foil and treating with Mg vapor at 900C forming MgB₂ weld at the terminal area of the contact portion with superconducting properties (Abstract, Claims 1-5; Para 0009-0010). The lead induction terminal in the vacuum chamber and an electrical heater for Mg were used in the process of joining the MgB₂ wires. All the limitations of the instant claims are met.

The reference is anticipatory.

3. Claims 17, 19, 21-23, 25, 27-28 and 30 are rejected under 35 U.S.C. 102(a/e) as being anticipated by Morita et al (US 2003/0051901).

Morita et al teach forming a superconductor connection structure including MgB₂ based superconductor lines with high performance for super conducting magnet system by applying MgB₂ powder and a metal powder to the connection point, and heating the connection point to a temperature equal to or higher than the melting point of one of the constituents forming a connection, and further forming a superconducting magnet apparatus using the structure (Abstract, Para 0002, 0015, 0017, 0023-0025, 0029; Fig, 1a, 2, 5a, 5b, 7, 8; Claims 1-2, 8). With regard to claims 25 and 28, the prior art teaches a superconducting magnet, and the examiner assures that the art article will be identical to that produced by the instant claimed process. All the limitations of the instant claims are met.

The reference is anticipatory.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 10,12, 15-16, 25-26 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giovanni (Conference SATT11, Vitetri SM(SA) Italy, 2002, March 19-22, Pages 8).

Giovanni teaches a method of making large bulk MgB₂ superconductor article by reactive infiltration of a boron perform by liquid magnesium at 950C (Abstract, Page-2, Fig-1, Page-3/Last Para).

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The prior art is silent about using other shapes of Boron perform such as wire, tape filaments in the process per claims 10 and 15 or an electromagnetic device per claim-29.

However, the prior art process is not limited to use only specific performs of boron, and it is suggestive of MgB₂ articles in power applications such as conductors and electric motors (Pg-7, Para-4) and it would have been obvious to a person of ordinary skill in the art to make use of other shapes of boron such as fiber, wire, ribbon, or tape in the process of making the components for the suggested applications with reasonable expectation of success.

With regard to claim 12, the prior art teaches a temperature of 950 C.

With regard to claims 25 and 28, the prior art teaches forming an article (Page-3, Fig-2; Page-4, Fig-3) and using the article in an electric motor, and the examiner asserts that the art article will be similar to that produced by the instant claimed process.

With regard to product-by-process claims 26 and 29, the prior art teaches forming an article (Page-3, Fig-2; Page-4, Fig-3) and using the article in an electric motor. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

2. Claims 15 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakai et al (JP 2002-324445).

Disclosure on the method of forming a long conductive composite of MgB₂ as set forth in rejection-1 under 35 USC 102(a) is herein incorporated.

The prior art is silent about dipping Boron tape in the molten magnesium or using an MgB₂ article in an electromagnetic device.

The prior art teaches forming tapes of MgB₂ by bundling the fibers and rolling to form a coil, and it does not limit the use of boron perform to any particular shape, and it would have been obvious to a

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person of ordinary skill in the art to use other forms of boron including the tape/ribbon in forming the coils with reasonable expectation of success. Further, it would have been obvious to use the MgB₂ coils of the art in motors that was common at the time of disclosure of the invention by the applicants as suggested by Giovanni (See rejection-1 under 35 USC 103(a)) with reasonable expectation of success.

3. Claims 18, 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al (US 2003/0051901).

The disclosure on the method of forming the superconductor connection and a structure containing the connection as set forth in rejection-3 under 35 USC 102(a/e) are here incorporated.

The prior art is silent about the method of heating the connection/joint per claim 18, heating it to a temperature between 600-1000C per claim 20, and forming a wire equal to or greater than 350,000 ft per claim 24.

However, the prior art teaches forming the superconductor connection by heating the joint to a point of melting one of the constituents that includes metals such as Ag, Al and Mg (Para 0024) and it would have been obvious to heat to about 962 C (Ag) or 660C (Al) or 650C (Mg) which are melting points of the respective metals, by conventional methods such as electrical resistive heating well known in the art with reasonable expectation of success (Miyoshi JP 2003-086265; Para 0010).

With regard to the length of the wire in the claim 24, the prior art teaches making superconductor connection for a magnet system, a current lead or a power transmission line with high performance (Abstract, Para 0002), and it would have been obvious to a person of ordinary skill in the art to optimize the length of the superconductor wire/article as desired with reasonable expectation of success, because the prior art does not limit the article to any particular lengths and suggestive of its use in power transmission.

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Allowable Subject Matter

Claims 1-9 are allowed.

The prior art of record neither teaches nor fairly suggest a method of manufacturing MgB₂ wires by filling a metal tube with mg, sealing the ends, deforming the tube and the critical step of contacting the tube with boron.

Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record neither teaches nor fairly suggest a method of making superconducting wire by intermittently contacting the boron substrate with molten magnesium. Although such a process step could have been obvious over process conditions in the art process, presence of such a step could not be established.

Conclusion

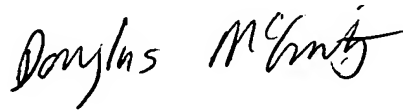
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8-5.30 Mon-Thu, 8-4.30 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on 571-272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMV
March 27, 2006.

A handwritten signature in black ink that reads "Douglas McGinty". The signature is written in a cursive, flowing style.

DOUGLAS MCGINTY
SUPERVISORY PATENT EXAMINER

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